# COSEWIC
# Status Appraisal Summary

on the

# Sand-verbena Moth
## *Copablepharon fuscum*

**in Canada**

**ENDANGERED**
**2013**

**COSEWIC**
Committee on the Status
of Endangered Wildlife
in Canada

**COSEPAC**
Comité sur la situation
des espèces en péril
au Canada

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# COSEWIC
# Assessment Summary

**Assessment Summary – November 2013**

**Common name**
Sand-verbena Moth

**Scientific name**
*Copablepharon fuscum*

**Status**
Endangered

**Reason for designation**
This moth and its host plant are habitat specialists dependent on coastal sand ecosystems, a rare and declining habitat along the West Coast of British Columbia. The species occurs at five small and isolated sites within a habitat that is highly threatened by erosion from increased winter storms and sea level rise, dune stabilization by invading vegetation, industrial and recreational development, recreational use, and the potential aerial application of pesticide to control the Gypsy Moth. The host plant and therefore the moth are facing continuing declines due to on-going erosion and degradation of coastal dunes.

**Occurrence**
British Columbia

**Status history**
Designated Endangered in November 2003. Status re-examined and confirmed in November 2013.

# COSEWIC
# Status Appraisal Summary

*Copablepharon fuscum*
Sand-verbena Moth — Noctuelle de l'abronie
Range of occurrence in Canada: British Columbia

**Status History:**

COSEWIC: Designated Endangered in November 2003. Status re-examined and confirmed in November 2013.

**Evidence:**

Wildlife species: *Copablepharon fuscum* Troubridge and Crabo 1996
Change in eligibility, taxonomy or designatable units: yes ☐ no ☒
Explanation:

Not applicable.

**Range:**

Sand-verbena Moth occurs in the Strait of Georgia – Puget Sound region of British Columbia (B.C.) and Washington State, and at one site on the west coast of Vancouver Island. Globally, there are ten known sites. Surveys from 2001 to 2012 found five sites in B.C.

Change in extent of occurrence (EO): yes ☒ no ☐ unk ☐
Change in index of area of occupancy (IAO) : yes ☒ no ☐ unk ☐
Change in number of known or inferred current locations*: yes ☒ no ☐ unk ☐
Significant new survey information yes ☒ no ☐

Explanation:

Five sites (Figure 1) are recorded for Sand-verbena Moth in B.C., two of which (4 and 5) are new since the original status report.

1. Cordova Shore (near Victoria) (COSEWIC 2003): three different landowners – Municipality of Central Saanich (local government), Tsawout First Nation and Capital Regional District (local government). Local government land is considered private land in B.C.
2. Goose Spit (near Comox) (COSEWIC 2003): three landowners – Comox First Nation, Department of National Defence (DND) 19 Wing Comox, and Comox Regional District (local government).
3. Sandy Island Provincial Park (near Comox) (COSEWIC 2003) – one landowner, provincial government.
4. James Island (near Victoria, first recorded in 2007) – one landowner, the Nature Conservancy. However, adjacent land owned by a separate private landowner contains similar habitat that has not been surveyed.

5. Long Beach, Pacific Rim National Park Reserve (near Tofino, first recorded in 2011) (McIntosh 2012). – one landowner, federal government.

These five sites translate to 4-6 locations in COSEWIC's use of that term, based on the threat of erosion from increased winter storms and storm surges.

The extent of occurrence (EO) is approximately 8116km$^2$, although most of the EO is non-shoreline habitat and not suitable for Sand-verbena Moth. The EO and the IAO could increase if more sites are found along the west coast of Vancouver Island or within the Georgia Strait. The moth's host plant is found in scattered sites along the west coast (Figure 2), but most of these sites are considered small, and less than the apparent minimum 400m$^2$ of flowering host plants in required for the moth to persist. Surveys in 2001-2002 did not find the moth at five of the west coast sand-verbena sites (COSEWIC 2003).

Figure 1: Sand-verbena Moth sites. Site 0 is in Washington State. Map created by Orville Dyer (B.C. Ministry of Forests, Lands and Resource Operations), December 2013.

Figure 2: Yellow Sand-verbena sites in southwestern British Columbia and northwestern Washington State. Dot colours represent different data sources. Map © E-Flora BC (Klinkenberg 2013).

**Population Information:**

Sand-verbena Moth locations are regionally isolated and there is probably no movement of individuals between locations. Preliminary studies imply that each location is composed of a series of subpopulations, which likely have a direct correlation with the patchy distribution of the species host plant, Yellow Sand-verbena (*Abronia latifolia*), in coastal spits and dunes. Actual numbers of individuals within any given population in B.C. is unknown.

Available general information on moth populations (from COSEWIC 2003) suggests 0.2 adults per $m^2$ is noted as an average density in habitat patches (Hanski *et al.* 1994); however, they vary between 0.0001 and 10.0 adults per $m^2$ (Nieminen 1996). Based on hand-searching for mature larvae in sand beneath dense Yellow Sand-verbena patches at two sites, population density of Sand-verbena Moth varied from 0.2 moths per $m^2$ to 6 moths per $m^2$ (Troubridge pers. comm. 2002 as stated in COSEWIC 2003).

| | |
|---|---|
| Change in number of mature individuals: | yes ☐ no ☐ unk ☒ |
| Change in population trend: | yes ☐ no ☐ unk ☒ |
| Change in severity of population fragmentation: | yes ☐ no ☒ unk ☐ |
| Change in trend in area and/or quality of habitat: | yes ☐ no ☒ unk ☐ |
| Significant new survey information | yes ☒ no ☐ |

Explanation:

Change in number of mature individuals: unknown.

Change in population trend: the loss of habitat from shoreline erosion (all sites) and development (Sites 1 and 2) continues (see **Threats**). Although two new sites are known since last status assessment, trends at these new sites are similar to those already recorded.

Changes in severity of population fragmentation: No change, but populations "possibly" severely fragmented, rather than definitely severely fragmented.

Change in trend in area and/or quality of habitat: Site 2) Goose Spit is threatened by development. All known sites are threatened with invasive species growth. Shoreline erosion is present at all sites. See **Threats**.

**Threats:**

The International Union of Conservation-Conservation Measures Partnership (2006) (IUCN-CMP) threats calculator was used to classify and list threats to Sand-verbena Moth (Salafsky *et al.* 2008; Master *et al.* 2009). The overall Threat Impact for this species is Very High (Table 1: Threats calculator for Sand-verbena Moth). Threats that are applicable to Sand-verbena Moth are further summarized below under the IUCN-CMP level 1 headings.

Change in nature and/or severity of threats: yes ☐ no ☒ unk ☐

Explanation:

**IUCN-CMP Threat 1. Residential and commercial development. Low Impact**

- *1.1 Residential and 1.2 commercial development* is applicable to part of Site 2 Goose Spit (portion owned by Comox First Nation), who has proposed mixed development on a portion of the spit. Site 4 James Island is currently for sale with proposed development of the island into smaller parcels of property, including unprotected portions that contain Yellow-sand Verbena but have not been surveyed for the moth.
- 1.3 *Recreational development* is applicable to 3/5 sites: Site 2 Goose Spit: a portion of this sand ecosystem includes Goose Spit Comox Regional District Park with recent small footprint construction of washroom facilities and parking spaces which result in small areas being cleared. Additional demand for parking spaces continues. Recreational development is considered a minor threat at Site 3 Sandy Island; staff considers species and habitats at risk when developing areas (e.g., washroom and wooden camping pad placement) at this site.

**IUCN-CMP Threat 4. Transportation and service corridors. Low Impact**

- 4.1 Road construction and 4.2 utility/service line construction is planned for Site 2 Goose Spit. Comox First Nation owns the tip of Goose Spit and at present there is a gate (although accessible to First Nations) preventing vehicles from driving out to the tip of the spit. Comox First Nation has plans to widen the road and possibly pave/gravel the road and allow full access to the site. Proposed development includes plans for a marina, commercial buildings and possibly a casino. Utility and service lines would be along this same route.

**IUCN-CMP Threat 6. Human intrusions and disturbance. Low Impact**

- 6.1 Recreational activities apply to 4/5 sites:
- Site 1 Cordova Shore sand ecosystem habitat is a popular area for walking, sun bathing, and in some cases, clearing of vegetation for camping;
- Site 2 Goose Spit, threats are applicable on all three landowner properties: i) HMCS Quadra 19 Wing

Comox holds a Sea Cadet Summer Training Camp each summer, and uses an obstacle course permanently situated within the natural sand habitat at Goose Spit. There are other species at risk on the property, and the environmental management staff at 19 Wing Comox have developed site-specific plans that minimize trampling and protect both the species and habitat; ii) Goose Spit Comox Regional District Park is a popular day use beach and picnic area, with threats to ecosystem from trampling, digging (e.g., sand castles), clearing of vegetation for sun bathing, and cars parking along the narrow roadsides; iii) Comox First Nation - applicable recreational use with all-terrain vehicles;

- Site 3 Sandy Island - Some areas within the park are used by 19 Wing Comox (DND) for sea cadet training during summer months. A site management plan has been created by DND to minimize impacts to sand ecosystems, Yellow Sand-verbena and other fragile ecosystem values. The public also uses wooden camping pads on the island, although camping often occurs off these wooden pads. Boaters and recreational users visit the island often, there is a large sandy beach and hiking trails traverse the island.
- Site 5 Long Beach is also a popular recreational walking and hiking beach.
- The threat does not apply to Site 4 James Island because the Nature Conservancy has a covenant on the property.

**IUCN-CMP Threat 7. Natural system modifications. Low Impact**

- 7.1 Fire suppression is ongoing throughout the area, and has been in place for > 100 years, and is considered a threat at all sites.

**IUCN-CMP Threat 8. Invasive and other problematic species. Medium Impact**

- *8.1 Invasive non-native* species are present at all sites, although the severity of the threat is variable: Scotch Broom (*Cytisus scoparius* (L.)), Gorse (*Ulex europeaus* L.) and other invasive plants are growing throughout Site 2) Goose Spit, and 19 Wing Comox land managers recently removed a large area of broom (in 2008). Site 4) James Island land managers, the Nature Conservancy, also has ongoing Scotch Broom/Gorse removal, with a land management objective of opening the sand dune ecosystems (Innis pers. comm. 2012). At these three sites, the percentage of the area covered with Scotch Broom is likely < 10% but growth is ongoing, especially without removal management actions. Site 5) Long Beach - minimal Scotch Broom but invasive grasses/forbs; Site 3) Sandy Island - minimal Scotch Broom but invasive grasses/forbs. Non-native rabbits are a potential problem at Site 2 Goose Spit.
- 8.2 Problematic native species. Native vegetative succession is evident at all sites. Patches of Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) and shrub vegetation is slow, but applicable to a portion of most habitats, specifically at the open sandy and forest interface areas of the habitat. Native deer are problematic at Site 4 James Island.

**IUCN-CMP Threat 9. Pollution. High Impact**

- *9.3 Agricultural and forestry effluents* - Gypsy Moth spray program is in place in B.C., and monitoring for the presence of Gypsy Moth is ongoing with a spray/treatment in the event the species is recorded. It is unlikely a spray program in one year would impact all five sites simultaneously; however, Site 1) Cordova Shore and Site 4) James Island are quite close to one another (approximately 500 metres) over water, and it is possible one Gypsy Moth spray would affect both sites in one year. There is the possibility of Gypsy Moth spray at Goose Spit but less so at Sandy Island. It is unlikely Long Beach will be treated for Gypsy Moth within the next ten years. Overall, Gypsy Moth introduction is highly possible at 2/5 sites (Goose Spit and Cordova Shore).

**IUCN-CMP Threat 10. Geological events. Unknown Impact**

- Earthquakes and tsunamis are threats at all sites, which are within tsunami zones and are only slightly above sea level (< 10 m elevation).

**IUCN-CMP Threat 11. Climate change and severe weather. Medium Impact**

- All known sites are within flood zones and subject to periodic winter storms. Sand spit at or only slightly above sea level (< 10 m elevation).

- Site 2) Goose Spit has experienced loss and/or erosion in the last ten years (due to storms and waves washing habitat away), and armouring of the north side of the spit was recently completed by 19 Wing Comox such that portions of the spit are prevented from further erosion. Prior to Goose Spit armouring, work had been completed at the sand deposition source (of shifting sand, where sand would originally come from and be deposited at the spit), at cliffs north in Comox, to prevent homes and property from eroding into the Georgia Strait. Ongoing sand deposition and/or erosion of the ecosystem.
- Site 1) Cordova Shore, Sites 3) Sandy Island and 4) James Island - ongoing sand deposition and/or erosion of the ecosystem, especially during winter months when storm surges impact the beach areas with logs and erosion. Process is partially natural and partially a likely result of climate change.
- Site 5) Long Beach is on the exposed west coast, and is known for the large storms that impact the beach; so the erosion is likely larger than the other four sites.

**Protection:**

Sand-verbena Moth is listed as Endangered under the federal *Species at Risk Act* (*SARA*) and critical habitat is protected on federal land (Site 1 portion of DND property at 19 Wing Comox) (Environment Canada 2012). On provincial land the species is protected in provincial parks and ecological reserves (Site 3 Sandy Island Provincial Park) under the B.C. *Park Act*. Invertebrates assessed by COSEWIC as Threatened, Endangered or Extirpated will be protected through the B.C. *Wildlife Act* and *Wildlife Amendment Act* once the regulations listing these species are completed. At present, the species is not protected under this Act.

Sand-verbena Moth is listed S1 (critically imperiled) in B.C., N1 (critically imperiled) in Canada (British Columbia Conservation Data Centre 2012), globally as G1G2 (rounded G1 critically imperiled) and S1? in Washington State (NatureServe 2012).

Change in effective protection: yes ☒ no ☐

Explanation:

Canadian sites occur predominantly within protected areas (Table 2) although there are ongoing threats to this habitat (see **Threats**). Protection measures include:

- Site 1 Cordova Shore: incorporated into joint ecosystem management planning by all three landowners (Cordova Shore Conservation Partnership Working Group 2010).
- Site 2 Goose Spit: HMCS 19 Wing Comox) has developed preliminary guidelines for activities in the portion of the Goose Spit they manage. Critical habitat has been identified on federal land (Environment Canada 2012).
- Site 3: Sandy Island Provincial Park – species and habitat protected under B.C. *Park Act*, although recreation and periodic infrastructure development is ongoing within the park.
- Site 4 James Island: Nature Conservancy established covenants on three sand ecosystem habitats on James Island, including the areas where Sand-verbena Moth has been recorded in 2007.
- Site 5 Long Beach: species is within Pacific Rim National Park Reserve, although critical habitat (see Environment Canada 2012) is not identified at this site. The species is protected by the Canada *National Parks Act* and SARA at this site.

**Table 2. Dune habitat at Canadian Sand-verbena Moth sites (COSEWIC 2003; Page 2005, 2007)**

| Population and site name | Park land (ha) | First Nations land (ha) | DND federal (ha) | Private land (ha) | Total dune area (ha)* |
|---|---|---|---|---|---|
| 1. Goose Spit | 0.4 (private land; Comox Regional District Park) | 2.4 | 7.0 | 0.0 | 9.8 |
| 2. Sandy Island Marine Provincial Park | 17.8 (B.C. crown land; provincial park) | 0.0 | 0.0 | 0.0 | 17.8 |
| 3. Island View Beach and Cordova Spit, Capital Regional Park | 3.6 (private land; Capital Regional District Park)<br>4.8 (private land; City of Saanich municipal park) | 11.8 | 0.0 | 0.0 | 20.2 |
| 4. James Island | 0.0 | 0.0 | 0.0 | 13.3 (Nature Conservancy of Canada) | 13.3 |
| 5. Long Beach | N/A (Pacific Rim National Park Reserve) | 0.0 | 0.0 | 0.0 | |

*Total dune area includes the area of sparsely vegetated or vegetated dunes rather than just the portion in which Sand-verbena Moth has been captured or Yellow Sand-verbena has been observed. It excludes developed areas and portions of the site with extensive tree or shrub cover.

**Rescue Effect:**

Rescue from the nearest population in the United States (San Juan Island) is unlikely; the population is 33.2 km from Site 1 Cordova Shore (COSEWIC 2003). There have been no studies on maximum dispersal distance for Sand-verbena Moth, although observations and trap records indicate the species is rarely found more than 25 m away from patches of its host plant Yellow Sand-verbena.

Change in evidence of rescue effect: yes ☐ no ☒

Explanation:

Information below was presented in the COSEWIC (2003) status report:

- Observations indicate Sand-verbena Moth is a strong flier (COSEWIC 2003). Moths disturbed during nectaring were often able to evade capture by hand net through rapid flight. Moths also flew strongly in winds between 5 and 15 km/hr. Noctuid moths are generally good dispersers and a mark-recapture study in Finland found dispersal distance as high as 30 km, although average distances were around 100 m (Nieminen 1996). Satellite patches of Yellow Sand-verbena located away from the central patch also supported Sand-verbena Moth at some sites.
- Based on observations of isolated, small Yellow Sand-verbena patches, these satellite patches are unlikely to support Sand-verbena Moth over the long term. Population persistence is therefore likely maintained by colonists from the central patch. The northern Strait of Georgia populations are approximately 6.7 km apart and may have infrequent immigration (e.g. < 1 migrant per year).

- The southern populations are more geographically isolated (mean, minimum and maximum distance between the six southern populations: 32.6, 3.9, 59.9 km respectively).
- The population at Cordova Shore and James Island is the most isolated Canadian population and the closest known population is 33.2 km away on San Juan Island.

**Quantitative Analysis:**

Not undertaken because of lack of data.

Change in estimated probability of extirpation: yes ☐ no☒unk ☐

Details:

**Summary and Additional Considerations**:

Recovery planning

- Recovery Strategy for Sand-verbena Moth (*Copablepharon fuscum*) in British Columbia posted to B.C. Recovery Planning website
- Federal Recovery Strategy for Sand-verbena Moth (*Copablepharon fuscum*) in Canada including critical habitat http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1045
- Coastal Sand Ecosystems Recovery Team formation in 2010. (www.coastalsandecosystems.ca).
- Status report on coastal sand ecosystems in British Columbia (Page *et al.* 2011).

Restoration and conservation of habitat:

- Site 1 Cordova Shore: Completion of Cordova Shore Conservation Strategy. Cordova Shore Conservation Partnership Working Group. 2010.
- Site 2 Goose Spit: Propagation and planting of host plant Yellow Sand-verbena on Canadian Forces Base property at Goose Spit (Page pers. comm. 2012) and Comox Regional District park property (Albert pers. comm. 2012; Heron pers. comm. 2012).
- Site 4 James Island: Nature Conservancy established covenants on three sand ecosystem habitats on James Island, including the areas where Sand-verbena Moth has been recorded in 2007. Ongoing work on Scotch Broom and Gorse removal within sand ecosystem habitats (Ennis pers. comm. 2012).
- Site 5 Long Beach: ongoing sand ecosystem habitat restoration (McIntosh pers. comm. 2012).

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## TECHNICAL SUMMARY

*Copablepharon fuscum*

Sand-verbena Moth — Noctuelle de l'abronie

Range of occurrence in Canada: British Columbia

**Demographic Information**

| | |
|---|---|
| Generation time | 1 yr |
| Is there an inferred continuing decline in number of mature individuals?<br>• Inferred from habitat loss at site Goose Spit and overall shoreline habitat erosion at all sites. | Yes. |
| Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations] | Unknown |
| [Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last 10 years.<br>• Inferred reduction based on cumulative habitat losses at all sites. | Yes, inferred from habitat losses. |
| [Projected or suspected] percent reduction in total number of mature individuals over the next 10 years.<br>• Suspected reduction based on habitat losses. | Yes, inferred from habitat losses. |
| [Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.<br>• Inferred based on habitat loss from shoreline erosion at all sites. | Yes. |
| Are the causes of the decline clearly reversible and understood and ceased?<br>• Habitat loss of sand ecosystems. | Yes. |
| Are there extreme fluctuations in number of mature individuals?<br>• There have been few individuals observed overall and the moth doesn't appear to exhibit population cycles. | No. |

**Extent and Occupancy Information**

| | |
|---|---|
| Estimated extent of occurrence<br><br>8116 km² although much of this area is not suitable habitat | 8116 km² |
| Index of area of occupancy (IAO)<br>(Always report 2x2 grid value). | 20 km² |
| Is the population severely fragmented? | Possibly |
| Number of locations* | 4-6, based on the threat of storm surges and flooding. |
| Is there an [observed, inferred, or projected] continuing decline in | No. |

* See Definitions and Abbreviations on COSEWIC website and IUCN 2010 for more information on this term.

| | |
|---|---|
| extent of occurrence? | |
| Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy? | No. |
| Is there an [observed, inferred, or projected] continuing decline in number of populations? | Yes, inferred from incremental habitat loss. |
| Is there an [observed, inferred, or projected] continuing decline in number of locations*? | No. |
| Is there an inferred continuing decline in area, extent and/or quality of habitat? | Yes. Observed based on incremental habitat loss from storm surges and invasive species. |
| Are there extreme fluctuations in number of populations? | No |
| Are there extreme fluctuations in number of locations*? | No |
| Are there extreme fluctuations in extent of occurrence? | No |
| Are there extreme fluctuations in index of area of occupancy? | No |

**Number of Mature Individuals (in each population)**

| Population | N Mature Individuals |
|---|---|
| | |
| | |
| Total | |
| | |

**Quantitative Analysis**

| | |
|---|---|
| Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years]. | No data available. |

**Threats (actual or imminent, to populations or habitats)**

- Increased storm surges and flooding, and resulting erosion of sand areas.
- Potential spray of Btk to control Gypsy Moth.
- Dune stabilization caused by invasive and native species, and fire suppression.
- Commercial development; transportation corridor development.
- Human disturbance/trampling of host plant.

**Rescue Effect (immigration from outside Canada)**

| | |
|---|---|
| Status of outside population(s)? Known from only 5 sites outside of Canada, within the Puget Sound area of Washington State. A petition has been submitted for listing under the United States federal *Endangered Species Act* (Xerces Society and WildEarth Guardians 2010). | |
| Is immigration known or possible? | Not known, not likely possible. |
| Would immigrants be adapted to survive in Canada? | Yes |
| Is there sufficient habitat for immigrants in Canada? | Yes. |
| Is rescue from outside populations likely? | Not likely. |

**Data-Sensitive Species**

| |
|---|
| Is this a data-sensitive species? No. |

**Status History**

| |
|---|
| COSEWIC: Designated Endangered in November 2003. Status re-examined and confirmed in November 2013. |

**Status and Reasons for Designation**

| **Status:** Endangered | **Alpha-numeric Code:** B2ab(iii) |
|---|---|
| **Reasons for Designation:** This moth and its host plant are habitat specialists dependent on coastal sand ecosystems, a rare and declining habitat along the West Coast of British Columbia. The species occurs at five small and isolated sites within a habitat that is highly threatened by erosion from increased winter storms and sea level rise, dune stabilization by invading vegetation, industrial and recreational development, recreational use, and the potential aerial application of pesticide to control the Gypsy Moth. The host plant and therefore the moth are facing continuing declines due to ongoing erosion and degradation of coastal dunes. | |

**Applicability of Criteria**

| |
|---|
| **Criterion A** (Decline in Total Number of Mature Individuals): Not applicable. No data available. |
| **Criterion B** (Small Distribution Range and Decline or Fluctuation): Meets Endangered B2ab(iii) since the IAO is 20km$^2$, since there are fewer than 5 locations (based on threat of erosion from increased winter storm) and since there is an observed decline in the area, extent and quality of habitat. |
| **Criterion C** (Small and Declining Number of Mature Individuals): Not applicable. No data are available; however, likely meets these criteria since host plant patches are small at known sites and moth captures are low. |
| **Criterion D** (Very Small or Restricted Population): Not applicable. Population data are not available. There are fewer than 5 locations, but the populations are not prone to the effects of events that could cause extirpation with a short time period. |
| **Criterion E** (Quantitative Analysis): Not applicable. No data available. |

**Table 1. IUCN Threats calculator results for Sand-verbena Moth (*Copablepharon fuscum*) in Canada. The threat classification below is based on the IUCN-CMP (World Conservation Union–Conservation Measures Partnership) unified threats classification system. For a detailed description of the threat classification system, see the Conservation Measures Partnership website (CMP 2010). For information on how the values are assigned, see Master *et al.* (2009) and table footnotes for details. Threats for Sand-verbena Moth were assessed across the species geographic range in Canada.**

| Sand-verbena Moth (*Coplablepharon fuscum*) | | | |
|---|---|---|---|
| Date of Assessment: November 2, 2012. | | | |
| Assessors: Jennifer Heron, Dave Fraser, Lea Gelling, Leah Ramsay | | | |
| | | **Level 1 Threat Impact Counts** | |
| **Threat Impact** | | **high range** | **low range** |
| A | Very High | 1 | 1 |
| B | High | 0 | 0 |
| C | Medium | 2 | 2 |
| D | Low | 4 | 4 |
| | **Calculated Overall Threat Impact:** | Very High | Very High |

| Threat | Impact (calculated) | Scope (next 10 Yrs) | | Severity (10 Yrs or 3 gen.) | Timing | Comments |
|---|---|---|---|---|---|---|
| 1 | Residential & commercial development | Low | Small (1-10%) | Moderate (11-30%) | Moderate (Possibly in the short term, < 10 yrs) | Potential to impact 2/5 locations: Site 4) James Island [housing development] and Site 2) Goose Spit [commercial development on 2/3 of the landowner properties]). Small cumulative impacts to 3/5 sites from recreational development (1) Cordova Shore; 2) Goose Spit; 3) Sandy Island. |
| 1.1 | Housing & urban areas | Not a Threat (in the assessed timeframe) | Small (1-10%) | Slight (1-10%) | Low (Possibly in the long term, >10 yrs) | Potentially applicable to part of Site 2 Goose Spit (portion owned by Comox First Nation), who has proposed mixed development on a portion of the spit. Site 4 James Island is currently for sale with proposed development of the island into smaller parcels of property, including unprotected portions that contain Sand-verbena Moth but have not been surveyed for the moth. The three sites on James Island where Sand-verbena Moth is present are within covenant-protected habitats (the Nature Conservancy holds the covenants); however, there are plans to subdivide the island into large lots for residential development. |
| 1.2 | Commercial & industrial areas | Low | Small (1-10%) | Moderate (11-30%) | Moderate (Possibly in the short term, < 10 yrs) | Threat applicable to 1/5 sites: Site 2) Goose Spit - Goose Spit has three land owners/managers: i) 19 Wing Comox - threat is applicable - land is a military training base and there is proposed development of a portion of the property that was restored with Yellow Sand-verbena, and the possibility of expanding the footprint of existing buildings is ongoing; ii) Comox First Nations - threat is present, plans for commercial development as a marina, restaurant, possibly casino but plans are unconfirmed, ongoing negotiations between governments; iii) Comox Regional District - threat not applicable. |

| Threat | Impact (calculated) | Scope (next 10 Yrs) | | Severity (10 Yrs or 3 en.) | Timing | Comments |
|---|---|---|---|---|---|---|
| 1.3 | Tourism & recreation areas | Low | Small (1-10%) | Slight (1-10%) | Moderate (Possibly in the short term, < 10 yrs) | Threat is applicable to 3/5 sites, although ecosystem values are considered when developing recreational infrastructure. 1) Cordova Shore: a portion of this sand ecosystem includes Island View Beach Capital Regional District Park, the area is a popular walking and bathing beach, and there is ongoing pressure to further develop the property; Site 2) Goose Spit - one landowner, Comox Regional District, operates Goose Spit Regional Park. The area is a popular picnic and bathing beach area (e.g., sandy beach). Recent small footprint construction of washroom facilities and parking spaces result in small areas being cleared. Staff are careful to minimize clearing habitat; Site 3) Sandy Island - considered a minor threat, staff consider species and habitats at risk when developing areas (e.g., washroom and wooden camping pad placement) at this site. |
| 2 | Agriculture & aquaculture | Not a Threat (in the assessed timeframe) | | | Insignificant/Negligible (Past or no direct effect) | Considered but not applicable, or perhaps applicable in the past. |
| 2.1 | Annual & perennial non-timber crops | Not a Threat (in the assessed timeframe) | | | Insignificant/Negligible (Past or no direct effect) | Considered but not applicable. Clearing of land for beach development or marine development requires authorization. If land is cleared, it is usually for housing/commercial development, because the land is very valuable. |
| 2.3 | Livestock farming & ranching | Not a Threat (in the assessed timeframe) | | | Insignificant/Negligible (Past or no direct effect) | Considered. Perhaps historically livestock grazing may have had an impact at some sites, but not considered a present-day threat. |
| 4 | Transportation & service corridors | Low | Small (1-10%) | Slight (1-10%) | Moderate (Possibly in the short term, < 10 yrs) | Potential impact to 1/5 known sites (Site 2 Goose Spit). |
| 4.1 | Roads & railroads | Low | Small (1-10%) | Slight (1-10%) | Moderate (Possibly in the short term, < 10 yrs) | Applicable to 1/5 known sites: 2) Goose Spit, three landowners - Comox First Nations owns the tip of Goose Spit and at present there is a gate (although accessible to First Nations) preventing vehicles from driving out to the land. Comox First Nations has plans to widen the road and possibly pave/gravel the road and allow full access to the site. Proposed development includes plans for a marina, commercial buildings and possibly a casino. Ongoing negotiations between governments. |
| 4.2 | Utility & service lines | Low | Small (1-10%) | Slight (1-10%) | Moderate (Possibly in the short term, < 10 yrs) | Applicable to 1/5 known sites: 2) Goose Spit, three landowners - Comox First Nations owns the tip of Goose Spit and at present there is a gate (although accessible to First Nations) preventing vehicles from driving out to the land. Comox First Nations has plans to widen the road and possibly pave/gravel the road and allow full access to the site. Ongoing negotiations between governments. |

| Threat | Impact (calculated) | Scope (next 10 Yrs) | | Severity (10 Yrs or 3 en.) | Timing | Comments |
|---|---|---|---|---|---|---|
| 5 | Biological resource use | Not a Threat (in the assessed timeframe) | | | Insignificant/Negligible (Past or no direct effect) | Considered. Site 1) Cordova Shore; Site 2) Goose Spit and Site 5) Long Beach are of cultural significance to First Nations - culturally significant plants growing throughout the habitat. Impacts from gathering are negligible. |
| 5.2 | Gathering terrestrial plants | Not a Threat (in the assessed timeframe) | | | Insignificant/Negligible (Past or no direct effect) | Considered. Site 1) Cordova Shore; Site 2) Goose Spit and Site 5) Long Beach are of cultural significance to First Nations and there are culturally significant plants growing throughout the habitat. Impacts from gathering are negligible. |
| 6 | Human intrusions & disturbance | Low | Pervasive (71-100%) | Slight (1-10%) | High (Continuing) | Potential impact to 4/5 known sites. |
| 6.1 | Recreational activities | Low | Pervasive (71-100%) | Slight (1-10%) | High (Continuing) | Applicable to 4/5 sites: Site 1) Cordova Shore - three landowners (i.Capital Regional District; ii) Tsawout First Nation; iii) Municipality of Saanich), threat applies throughout entire sand habitat. Popular area for walking, trampling of vegetation, sun bathing, and small clearing of vegetation for camping; Site 2) Goose Spit - to all landowners: i) HMCS Quadra 19 Wing Comox holds a Sea Cadet Summer Training Camp each summer, and uses an obstacle course permanently situated within the natural sand dune habitat at Goose Spit. There are other SAR on the property, and the environmental management staff at 19 Wing Comox have developed site-specific plans that minimize trampling and protect both the species and habitat; ii) Goose Spit Comox Regional District Park - popular day use beach and picnic area, with threats to ecosystem from trampling, digging (e.g., sand castles), clearing of vegetation for sun bathing, and cars parking along the narrow roadsides; iii) Comox First Nation - applicable recreational use with all-terrain vehicles; 3) Sandy Island - Some areas within the park are used by 19 Wing Comox (DND) for sea cadet training during summer months. A site management plan has been created by DND to minimize impacts to sand dune and other fragile ecosystem values. The public also uses wooden camping pads on the island, although camping often occurs off these wooden pads. The island is visited often by boaters and recreational users. There is a large sandy beach and hiking trails traversing the island; Site 5) Long Beach, is also a popular recreational walking and hiking beach. The threat does not apply to Site 4) James Island because the Nature Conservancy has a covenant on the property. |

| Threat | Impact (calculated) | Scope (next 10 Yrs) | | Severity (10 Yrs or 3 en.) | Timing | Comments |
|---|---|---|---|---|---|---|
| 6.2 | War, civil unrest & military exercises | Negligible | Negligible (<1%) | Negligible (<1%) | High (Continuing) | Two sites are impacted from military training exercises: Site 1) Goose Spit (DND property portion) and Sandy Island Provincial Park (some beach front access areas). The threats from military training exercises are addressed and managed by staff and B.C. Parks managers. |
| 7 | Natural system modifications | Low | Pervasive (71-100%) | Slight (1-10%) | Unknown | Fire suppression is ongoing throughout the area, and has been in place for > 100 years. At all known sites fire suppression is considered a threat. |
| 7.1 | Fire & fire suppression | Low | Pervasive (71-100%) | Slight (1-10%) | Unknown | Fire suppression is ongoing throughout the area, and has been in place for > 100 years. At all known sites fire suppression is considered a threat. |
| 8 | Invasive & other problematic species & genes | Medium | Pervasive (71-100%) | Moderate (11-30%) | Moderate (Possibly in the short term, < 10 yrs) | Applicable to all sites, although the severity of the threat is variable between sites. The threats from invasive species |
| 8.1 | Invasive non-native/alien species | Low | Pervasive (71-100%) | Slight (1-10%) | High (Continuing) | Applicable at all sites, although the severity of the threat is variable: Site 1) Cordova Shore; Site 2) Goose Spit; Site; and 4) James Island - Scotch Broom, Gorse and other invasive plants are growing throughout and causing changes to the ecosystems. At site 2) Goose Spit, 19 Wing Comox portion of the property - the land managers recently removed a large area of broom, and at Site 4) James Island, the Nature Conservancy also has ongoing Scotch Broom/Gorse removal, both land management objective of opening the sand dune ecosystems. At these three sites, the percentage of the area covered with Scotch Broom is likely < 10% but growth is ongoing, especially without removal management actions. Site 5) Long Beach - minimal Scotch Broom but invasive grasses/forbs; Site 3) Sandy Island - minimal Scotch Broom but invasive grasses/forbs. Non-native rabbits are a potential problem at Site 2 Goose Spit. |
| 8.2 | Problematic native species | Low | Pervasive (71-100%) | Slight (1-10%) | High (Continuing) | Natural native vegetation succession is evident at all sites. Patches of Douglas-fir and shrub vegetation is slow, but applicable to a portion of most habitats, specifically at the open sandy beach/dune and forest interface areas of the habitat. Native deer are problematic at Site 4 James Island. |
| 9 | Pollution | Very High | Pervasive (71-100%) | Extreme (71-100%) | Unknown | |
| 9.2 | Industrial & military effluents | Not a Threat (in the assessed timeframe) | | | Insignificant/Negligible (Past or no direct effect) | May be applicable at Site 2) Goose Spit (HMCS Quadra, 19 Wing Comox); however, not currently applicable. |

| Threat | Impact (calculated) | Scope (next 10 Yrs) | | Severity (10 Yrs or 3 en.) | Timing | Comments |
|---|---|---|---|---|---|---|
| 9.3 | Agricultural & forestry effluents | High | Large (31-70%) | Serious (31-70%) | Unknown | Gypsy Moth spray program in place, monitoring for the presence of Gypsy Moth is ongoing with a spray/treatment in the event the species is recorded. It is unlikely a spray program in one year would impact all five sites simultaneously; however, Site 1) Cordova Shore and Site 4) James Island are quite close to one another (approximately 500 metres) over water, and it is possible one Gypsy Moth spray would affect both sites in one year, despite James Island being more isolated and less likely to have visitors/camping and subsequent introduction of the moth. Goose Spit has a high probability of Gypsy Moth introduction due to the large number of people that visit the area. Sandy Island is near Comox but the possibility of Gypsy Moth introduction is less. There is a low probability of Gypsy Moth presence at Long Beach. Overall, Gypsy Moth introduction is highly possible at 2/5 sites (Goose Spit and Cordova Shore). |
| 10 | Geological events | Unknown | Unknown | Unknown | Unknown | |
| 10.2 | Earthquakes/ tsunamis | | Unknown | Unknown | Unknown | All sites are within tsunami zones and are only slightly above sea level (< 10 m elevation). |
| 11 | Climate change & severe weather | Medium | Pervasive (71-100%) | Moderate (11-30%) | Unknown | |
| 11.1 | Habitat shifting & alteration | Low | Pervasive (71-100%) | Slight (1-10%) | High (Continuing) | Sea level rise is applicable to all sites. BC Parks completed shoreline assessment |

| Threat | Impact (calculated) | Scope (next 10 Yrs) | | Severity (10 Yrs or 3 en.) | Timing | Comments |
|---|---|---|---|---|---|---|
| 11.4 | Storms & flooding | Low | Pervasive (71-100%) | Slight (1-10%) | High (Continuing) | All known sites are within flood zone and subject to periodic winter storms. Sand spit at or only slightly above sea level (< 10m elevation). Site 2) Goose Spit has experienced loss and/or erosion in the last ten years (due to storms and waves washing habitat away), and armouring of the north side of the spit was recently completed by 19 Wing Comox such that portions of the spit are prevented from further erosion. Prior to Goose Spit armouring, work had been completed at the sand deposition source (of shifting sand, where sand would originally come from and be deposited at the spit), at cliffs north in Comox, to prevent homes and property from eroding into the Georgia Strait. Ongoing sand deposition and/or erosion of the ecosystem. Process is partially natural, and partially a likely result of climate change. Whole deposition process at Goose Spit has been altered from both cliff (sand source) armouring, and spit (sand deposition/erosion) armouring. Sites 1) Cordova Shore, 3) Sandy Island and 4) James Island - ongoing sand deposition and/or erosion of the ecosystem, especially during winter months when storm surges impact the beach areas with logs and erosion. Process is partially natural, and partially a likely result of climate change. Site 5) Long Beach is known for the large storms and surges that impact the beach; as well there is no land mass to prevent waves and surges so the erosion is likely larger than at the other four sites. |

## COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

## COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

## COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

## DEFINITIONS
## (2013)

| | |
|---|---|
| Wildlife Species | A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years. |
| Extinct (X) | A wildlife species that no longer exists. |
| Extirpated (XT) | A wildlife species no longer existing in the wild in Canada, but occurring elsewhere. |
| Endangered (E) | A wildlife species facing imminent extirpation or extinction. |
| Threatened (T) | A wildlife species likely to become endangered if limiting factors are not reversed. |
| Special Concern (SC)* | A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats. |
| Not at Risk (NAR)** | A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances. |
| Data Deficient (DD)*** | A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction. |

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.

Environment Canada | Environnement Canada

Canadian Wildlife Service | Service canadien de la faune

Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.